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OPERATING AND SERVICING INSTRUCTIONS FOR MODEL C-6B RESISTANCE METER

H-294

HATHAWAY

DENVER, COLO.

Can be used for the C-6 Model also.

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OPERATING AND SERVICING INSTRUCTIONS FOR MODEL C-6B RESISTANCE METER

H-294

Instrument
In FTE Area 5-15-67

NOTE

This Instruction Manual is written as a guide for the use of this instrument.

The Manual describes the instrument and its uses sufficiently to provide a complete understanding of its applications and procedures for periodic calibration. We do, however, on occasion make changes in the wiring layout, mechanical mounting of parts, or minor component and schematic changes for the general improvement of the instrument, which will not be disclosed in the information contained in this Manual. Exact schematic diagrams applicable to your instrument may be obtained by written request listing the Model, Catalog and Serial number of the instrument.

OPERATING AND SERVICING INSTRUCTIONS FOR MODEL C-6B RESISTANCE METER

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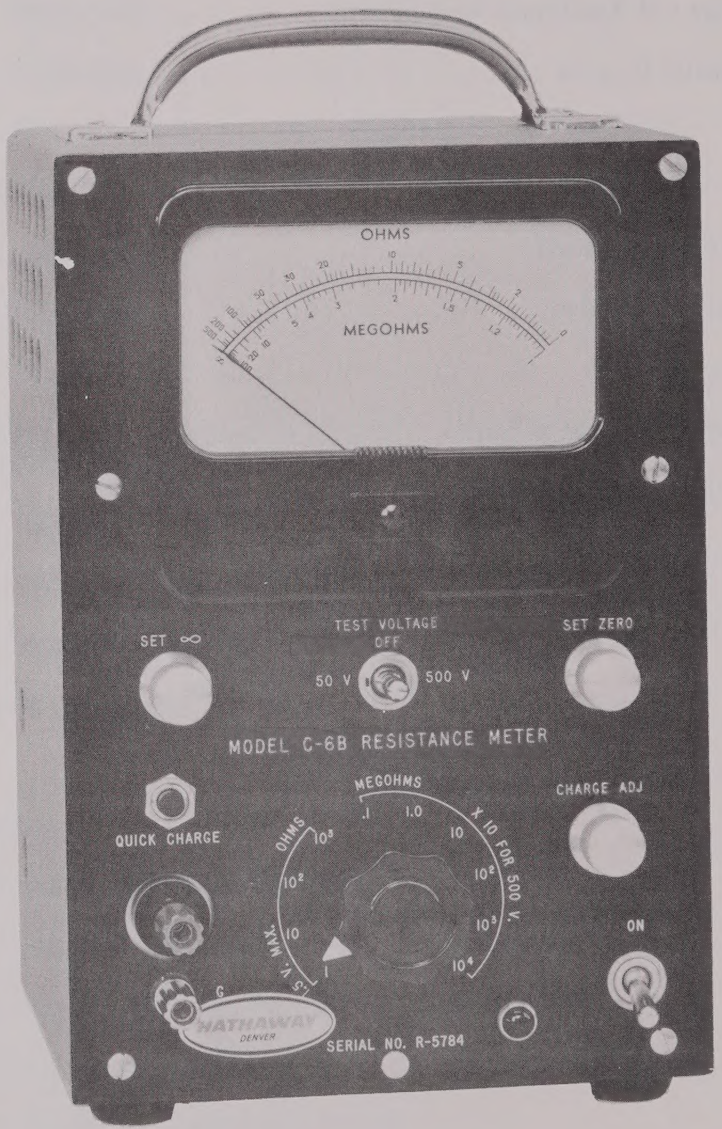


FIGURE 1-0. MODEL C-6B RESISTANCE METER

SECTION 1

GENERAL INFORMATION

1-1. INTRODUCTION

This manual contains operation and maintenance instructions for the portable and rack-mounted Model C-6B Resistance Meter. Specifications, principles of operation and parts lists are also included.

The C-6B is portable and battery operated as a conventional shunt-type ohmmeter in the ohms range, to five hundred thousand ohms. The instrument functions to perform resistance measurements from zero to ten million megohms, utilizing three test voltages, including 500 volts designed for testing insulation in accordance with military specifications and for testing capacitors having a working voltage higher than 500 volts. The instrument is particularly useful for making critical measurements of capacitor leakage.

1-2. SPECIFICATIONS

A. Electrical specifications

(1) Ranges

a. OHMS – 0 to 500,000 ohms in 4 steps, at 1-1/2 volts applied potential.

b. MEGOHMS – 100,000 ohms to 1,000,000 megohms in 6 steps, at 50 volts applied potential. One megohm to 10,000,000 megohms in 6 steps, at 500 volts applied potential.

(2) Accuracy

a. OHMS – within 3% of full scale deflection (approximately ± 3 degrees on a full meter scale arc of 100 degrees) ± 1 ohm.

b. MEGOHMS – within 3% of full scale on first five ranges; within 5% on the 10^4 range.

(3) Power Requirements

a. 115 v ac, 50-60 cps, 25 watts.

b. 1-1/2 v dc, dry cell.

B. Mechanical specifications

(1) Size (Overall)

a. Portable

11-1/4" high, 6-1/2" wide, 6-3/4" deep.

b. Rack-Mounted

10-1/2" high, 19" wide, 6-3/4" deep.

(2) Weight

a. Portable

8-3/4 lbs.

b. Rack-Mounted

10-1/2 lbs.

(3) Meter Scale

Semi-logarithmic; full meter scale arc of 100 degrees.

(4) Finish

a. Portable

Anodized and engraved aluminum front panel.

with blue crackle-finish aluminum case.

b. Rack-Mounted

Anodized and engraved aluminum front panel with gray crackle-finish aluminum chassis cover.

SECTION 2

INSTALLATION

2-1. UNPACKING AND HANDLING

The Model C-6B Resistance Meter is shipped in a specially designed heavy cardboard box. If desired, the box may be saved for future shipping or storing of instrument.

Examine instrument carefully for possible damage in shipment. If instrument has been damaged, see paragraph 8-2.

2-2. SITE SELECTION

Operate the instrument in a vertical position only, placed far enough from walls and other obstructions to allow free air flow through case ventilation holes.

CAUTION

Do not place instrument on or near other heat generating equipment.

When making high resistance measurements, it is desirable to locate the C-6B in a position which will allow ample clearance for suspension of the components under test. For such tests, components should not rest on a table surface or be held in a manner which might enhance the leakage path.

2-3. POWER REQUIREMENTS

Power consumption of the Model C-6B is rated at 25 watts. It will operate from any 115 v ac, 60 cps source. External power is not required to operate instrument in OHMS ranges.

SECTION 3

OPERATION

3-1. OPERATION

The Model C-6B Resistance Meter can be used to measure resistance from 0 to 10,000,000 megohms. It is particularly useful for making critical measurements of capacitor leakage. Meter zero adjustment is made with range selector in an OHMS range position only. Infinity adjustments are made with range selector in a MEGOHMS range position.

CAUTION

Do not short-circuit input terminals while range selector switch is in a megohms position.

Avoid accidental shunting of circuit under test when making high resistance measurements. Leads should not touch, and a component being tested should not be allowed contact with another surface such as a bench top. Best results are obtained by suspending component in air directly from the meter.

The 50 v test voltage is provided for measuring leakage of capacitors having a working voltage less than 500 volts. The 500 v range is designed for testing insulation in accordance with military specifications, and for testing capacitors having a working voltage higher than 500 volts.

CAUTION

Leave TEST VOLTAGE switch in OFF position until test voltage is required.

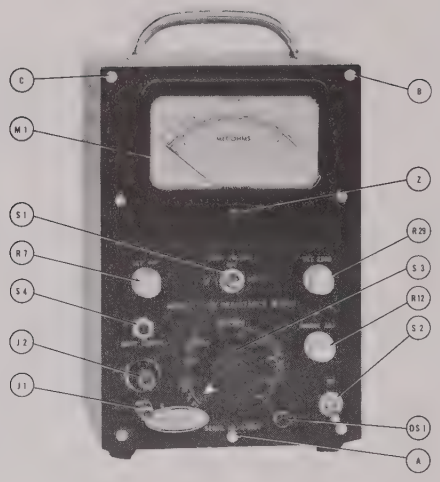


FIGURE 3-1. FRONT PANEL CONTROLS

TABLE 3-1. FRONT PANEL CONTROLS

REFERENCE DESIGNATION	CONTROL (See figure 3-1)
DS1	Pilot Lamp Lens
S2	Power switch
S3	Range switch
R12	CHARGE Adj.
R29	SET ZERO
Z	Mechanical zero adjust.
S1	TEST VOLTAGE
R7	SET ∞
S4	QUICK CHARGE
J2	Positive input terminal
J1	Ground input terminal

3-2. PREPARATION FOR USE

A. Control settings (See figure 3-1)

(1) Set TEST VOLTAGE switch S1 to OFF.

(2) Leave terminals J1/J2 open.

(3) Set power switch S2 to ON position and allow approximately one minute for instrument warm-up.

B. Zero and infinity settings.

(1) Turn range switch S3 to 1 OHM position.

(2) Short-circuit input terminals.

(3) Adjust meter pointer to zero with SET ZERO control.

(4) Open-Circuit input terminals.

(5) Turn range switch S3 to .1 MEGOHMS position.

(6) Set meter pointer on infinity mark by use of SET ∞ control.

3-3. OPERATING PROCEDURES

A. Resistance measurements

(1) Turn range switch S3 to 1 OHM position.

(2) Connect unknown resistance between input terminals.

(3) Set TEST VOLTAGE switch S1 to 50 V position. The 500 V position may be used for upper megohm range positions.

(4) Turn range switch S3 clockwise to a position that produces an indication on the meter. If range switch S3 is in an OHMS position, read upper meter scale and multiply reading by factor indicated by range switch. Zero to 500,000 ohms can be measured in the OHMS range.

CAUTION

Do not rotate range switch S3 CCW from MEGOHMS to an OHMS range position with a capacitor connected between input terminals J1/J2.

TEST VOLTAGE switch S1 must be set to 50 V or 500 V position for the MEGOHMS range to be operative. Read the lower meter scale and multiply by factor indicated by range switch. Multiply this value by 10 is TEST VOLTAGE switch S1 is set to 500 V position. 100,000 ohms to 10,000,000 megohms can be measured in the megohm range.

(5) Set TEST VOLTAGE switch S1 to OFF position before disconnecting resistor.

CAUTION

To prevent meter pointer slamming, read resistance value on lowest range possible. Example: 1 megohm should be read as 10 on megohm scale and multipled by .1 as indicated by range switch. Do not advance range switch to 1.0 megohm.

B. Capacitor leakage test

Test all capacitors having a working voltage less than 500 volts with TEST VOLTAGE switch S1 set to 50 V position.

(1) Open-circuit input terminals J1/J2.

(2) Turn range switch S3 to 10^2 MEGOHMS position.

(3) Press and hold QUICK CHARGE switch (S4 figure 3-1).

(4) Set meter pointer to 500 megohms (5 on lower meter scale x 10^2 MEGOHMS as indicated by range switch with CHARGE ADJUST control (R12, figure 3-1) and release QUICK CHARGE switch S4.

(5) Connect capacitor between input terminals J1/J2.

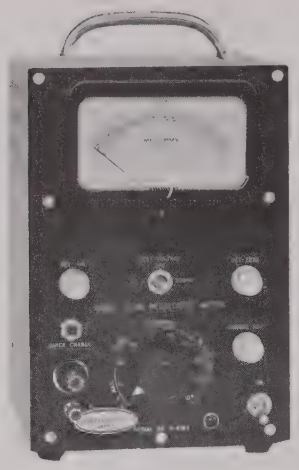
(6) Press and hold QUICK CHARGE switch S4 until meter reads 500 megohms.

(7) Release button. If meter pointer moves toward infinity mark, capacitor has a leakage resistance value higher than 500 megohms. If pointer moves toward 1, leakage resistance is less than 500 megohms. Range switch S3 can be turned to higher or lower positions for different values of leakage resistance. For production use, capacitors which are to have a leakage resistance higher than a given value can be checked by setting up the C-6B to measure resistance, and then each capacitor rapidly tested as outlined above.

(8) Set TEST VOLTAGE SWITCH S1 to OFF position before disconnecting capacitor.

WARNING

Discharge capacitors after testing.



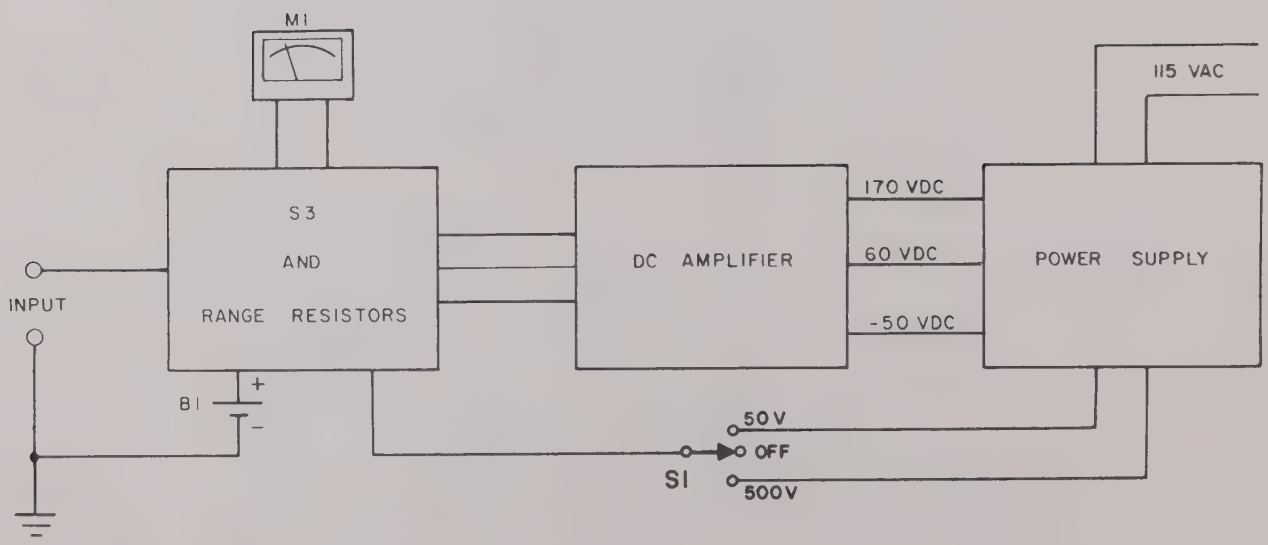


FIGURE 4-0. MODEL C-6B RESISTANCE METER

SECTION 4

PRINCIPLES OF OPERATION

4-1. OVERALL DESCRIPTION

The circuitry of the Model C-6B is designed to operate as an ohmmeter or megohmmeter. When measuring capacitance leakage, a push-button QUICK CHARGE switch may be used to shunt the range resistors allowing the test voltage to rapidly charge the capacitor being tested.

4-2. FUNCTIONAL SECTIONS

A. Ohmmeter

When range switch S-3 is rotated to an ohms range, circuits are connected as shown in Figure 4-1. The positive input terminal is placed in series with selected ohms range resistor and dry cell B1. Meter M1, in series with R-29 and R-30, is connected across the selected range resistor. If an unknown resistance is connected between in the input terminals, a current, inversely proportional to its resistance, will flow and produce a voltage drop across the selected range resistor and the unknown resistance. Meter M-1 is calibrated to indicate the value of unknown resistance. Short-circuiting input terminals causes the battery voltage to be impressed across selected range resistor. The meter pointer may then be set to indicate full scale (zero) by rotating SET ZERO control R-29. Dry cell B1 supplies the only ohmmeter power required.

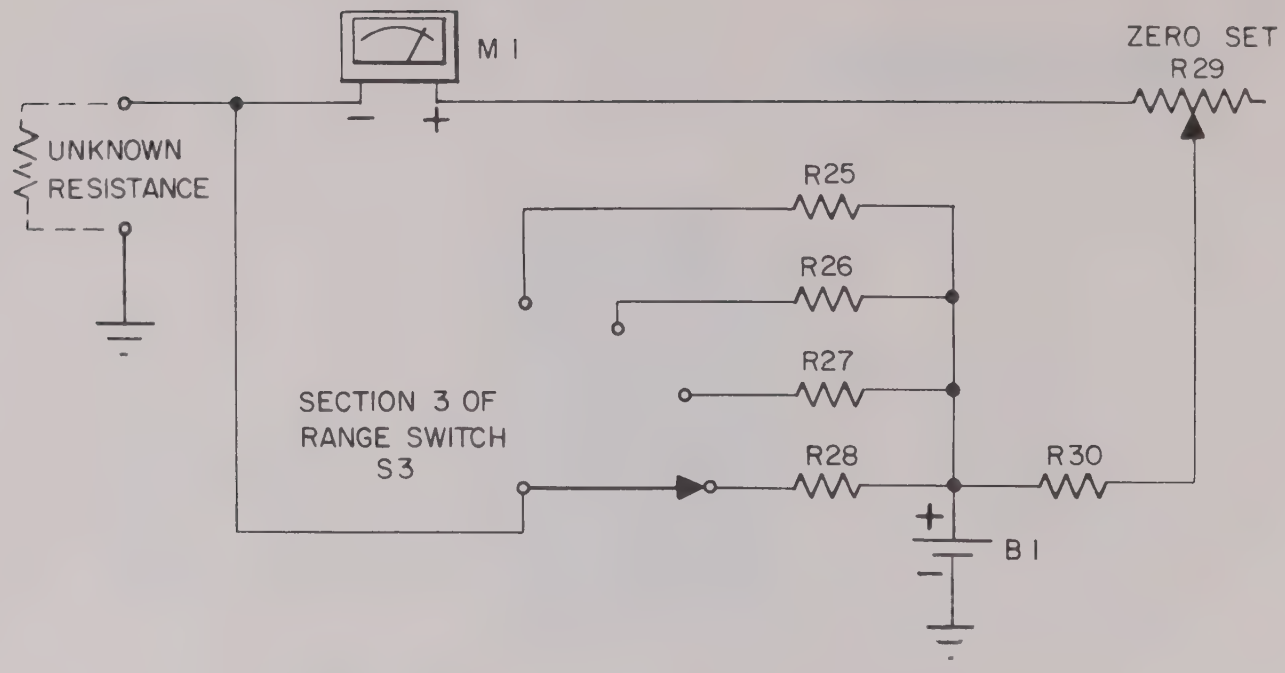


FIGURE 4-1. SIMPLIFIED OHMMETER CIRCUIT.

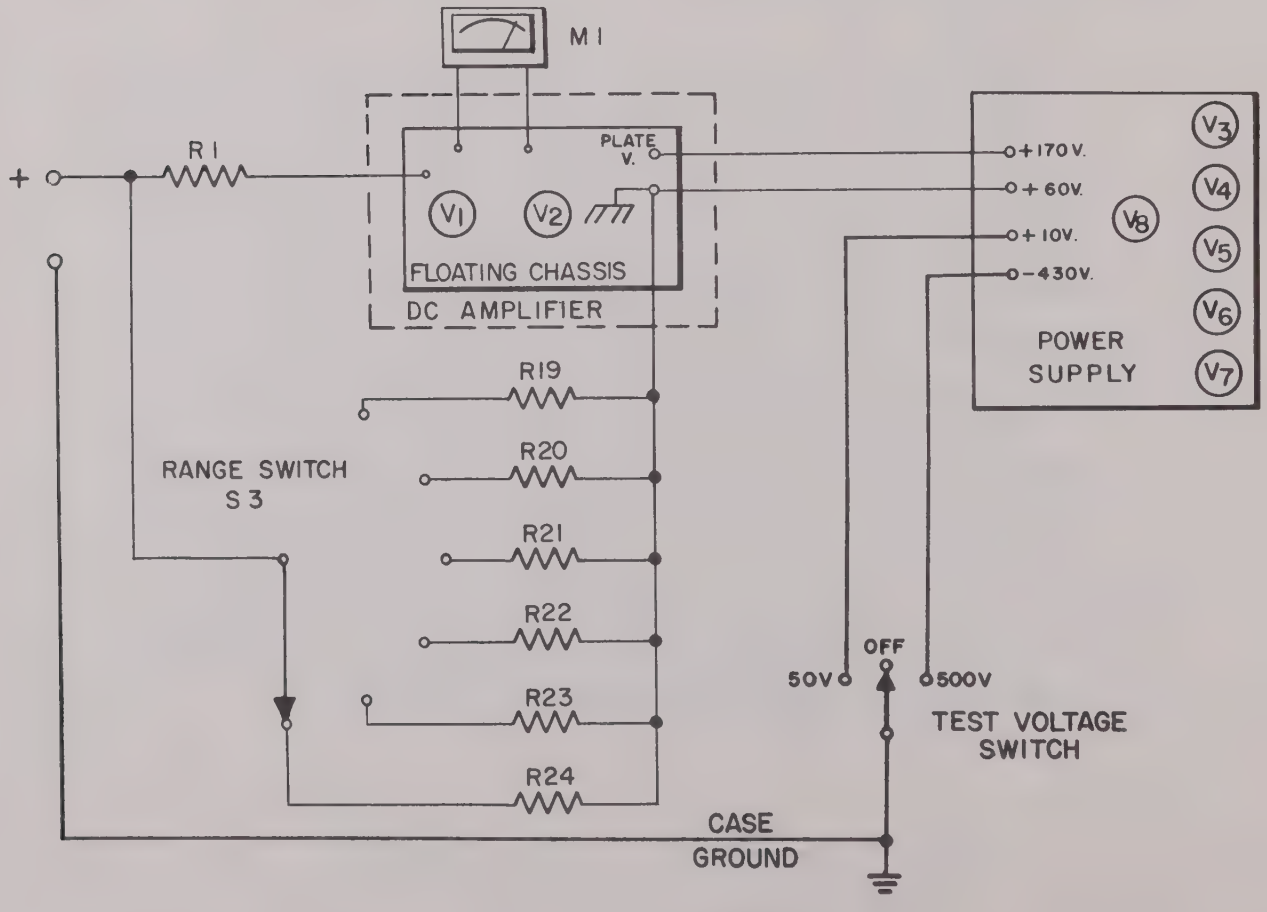


FIGURE 4-2. SIMPLIFIED MEGOHMMETER CIRCUIT.

B. Megohmmeter

When range switch S3 is rotated to a megohms range, circuits are connected as shown in Figure 4-2. A d-c amplifier, consisting of V_1 and V_2 is connected to amplify the low voltage drop produced across selected range resistor. The amplifier is mounted on a floating chassis which is insulated from case at 60 volts or 110 volts below V_2 plate voltage. Selected range resistor is in series with positive input terminal J2 and floating chassis ground. The case-grounded negative terminal is connected through dry cell B1 to TEST VOLTAGE switch S1. An unknown resistance connected between input terminals is placed in series with selected range resistor and the potential difference between case ground and floating chassis ground. The meter is calibrated to indicate value of unknown resistor. The floating chassis and below chassis level negative input terminal configuration lessens the possibility and eliminates the effects of leakage, within the instrument. Full test voltage shunts the unknown resistance connected between input terminals while the amplifier circuit operates at normal voltage levels.

C. Capacitor leakage test

Capacitor leakage resistance is determined by measuring resistance of the dielectric material between the capacitor plates. The exact value of resistance is seldom required. Specifications usually require leakage resistance of certain capacitors to be higher than a given value. In this case, the C-6B is set-up to

measure the specified resistance, (see paragraph 3-3, B), after which the capacitor is tested. If resistance is indicated to be higher than the specified value, a capacitor is considered "good." To measure exact values of resistonce, follow steps outlined in paragraph 3-3, B. Meter pointer will move away from the 500 megohm set point and stop at a capacitor resistance value. Change range if meter pointer moves to end of scale. Push-button switch S4 shunts selected range resistor to rapidly charge capacitor being tested.

CAUTION

Range switch S3 may not be rotated from megohms to an ohms range position after a capacitor has been connected between input terminals and charged through TEST VOLTAGE switch S1.

SECTION 5

TROUBLE-SHOOTING

5-1. GENERAL

Procedures outlined in this section facilitate location and isolation of components that have become defective. Common troubles that may develop are presented in Table 5-1. Voltage and resistance measurements are listed in Figures 5-5 and 5-6. Parts can be located in Figures 5-1 through 5-4. Sectional trouble shooting is broken down into two steps, ohmmeter and megohmmeter test.

WARNING

The high voltage present in this instrument is dangerous. Exercise extreme care in making tests with power applied. Use insulated test probe only.

5-2. TEST EQUIPMENT AND SPECIAL TOOLS

A volt-ohm meter is the only test equipment required to service this instrument. The meter used must have an input impedance of 10 megohms or higher. If a meter with a lower input impedance is used, the voltages measured will vary from those listed in this manual. Special tools are not required.

5-3. PRELIMINARY CHECK

A. Visual Inspection

Loosen screws A, B, and C, Figure 3-1, and remove instrument from case. Make a complete visual inspection noting discolored components, charred wire, melted solder and loose connections. Check switches for cleanliness and broken sections. Check control knobs for proper alignment.

B. Tube Check

If instrument does not operate properly in the megohm ranges only, replace all tubes with tubes known to be good.

C. Control Setting

Set the following controls in position indicated.

(1) TEST VOLTAGE switch: 50v position.

(2) Range selector switch: 1 MEGOHM position.

D. Sensory Observation

Observe components for overheating and tubes for heater failure. Repair defects.

E. Operational Check

Operate the instrument to determine if failure has been corrected. If a tube is found defective, the circuit should also be investigated.

5-4. SECTIONAL TROUBLE-SHOOTING

A. Ohmmeter

(1) Disconnect AC power cord from source.

(2) Set range selector switch to 1 ohm position.

(3) Connect test voltmeter to input terminals. Meter should read 1.5 v to 1.6 v.

(4) Rotate range selector to 10, 10^2 and 10^3 position. Voltage reading should not change. This test indicates continuity of range circuit and condition of B-1.

(5) Disconnect B-1 and negative terminal of meter, M-1, to measure resistance of range resistors from C-6B input terminals.

(6) Repair defects.

> **CAUTION**
>
> Do not attempt to measure resistance of range resistors with B-1 connected.

B. Megohmmeter

(1) Voltage measurement

a. Connect ac power cord and set power switch to ON.

b. Set TEST VOLTAGE switch to 50 V position.

c. Rotate range selector switch to .1 MEGOHM position.

d. Connect negative lead of test voltmeter to instrument chassis point J1.

e. Measure voltages as shown in Figure 5-6.

(2) Resistance measurement

a. Disconnect ac power cord.

b. Set TEST VOLTAGE switch in 50 V position.

c. Rotate range selector switch to .1 MEGOHM position.

d. Connect one lead of test ohmmeter to pin 4 of V4.

e. Measure resistance as listed in Figure 5-6.

5-5. POSSIBLE TROUBLES

Table 5-1 lists possible troubles that may develop and probable causes. This does not imply that these troubles are frequent occurrences.

TABLE 5-1. POSSIBLE TROUBLES

Trouble	Check
Pilot lamp does not illuminate when power switch is set to ON.	(A) Power Cord (B) Fuse (C) Pilot Bulb (D) Switch S2
Meter pointer cannot be set to zero with SET ZERO control.	(A) Operating procedures (see para. 3-2. B). (B) Battery B-1.
Meter Pointer cannot be set to infinity mark with SET INFINITY control.	(A) Operating procedures (see para. 3-2, B). (B) Power supply
Meter reads below 1 on .1 MEGOHM scale with range selector in .1 MEGOHM position. Same as above except with resistance known to be higher than range selector position connected to input terminals.	(A) Input terminals or (B) Input terminals shunted by an electrical path.
Quick Charge Inoperative	(A) S-4, Check contact (B) R-12.

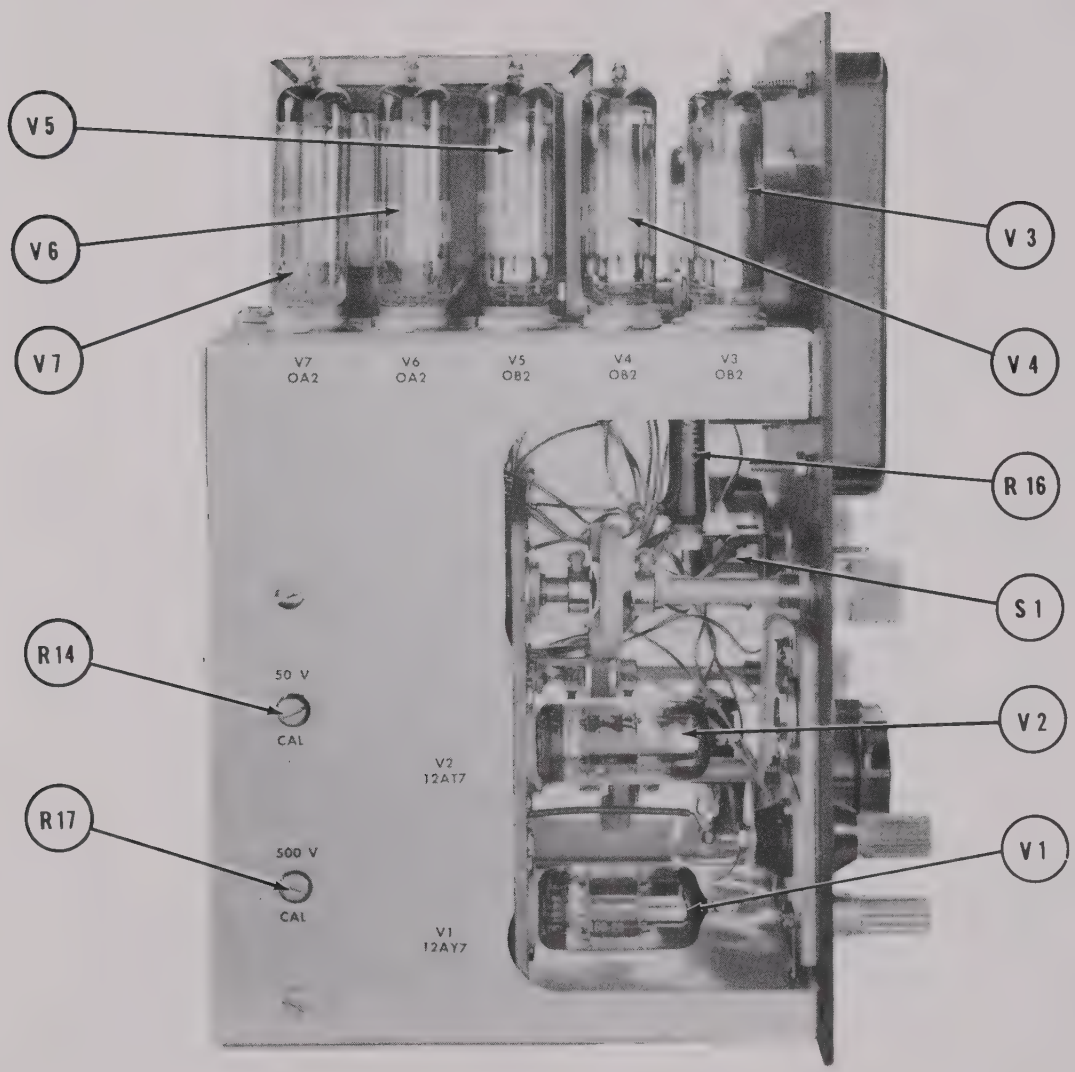


FIGURE 5-1. RIGHT SIDE VIEW

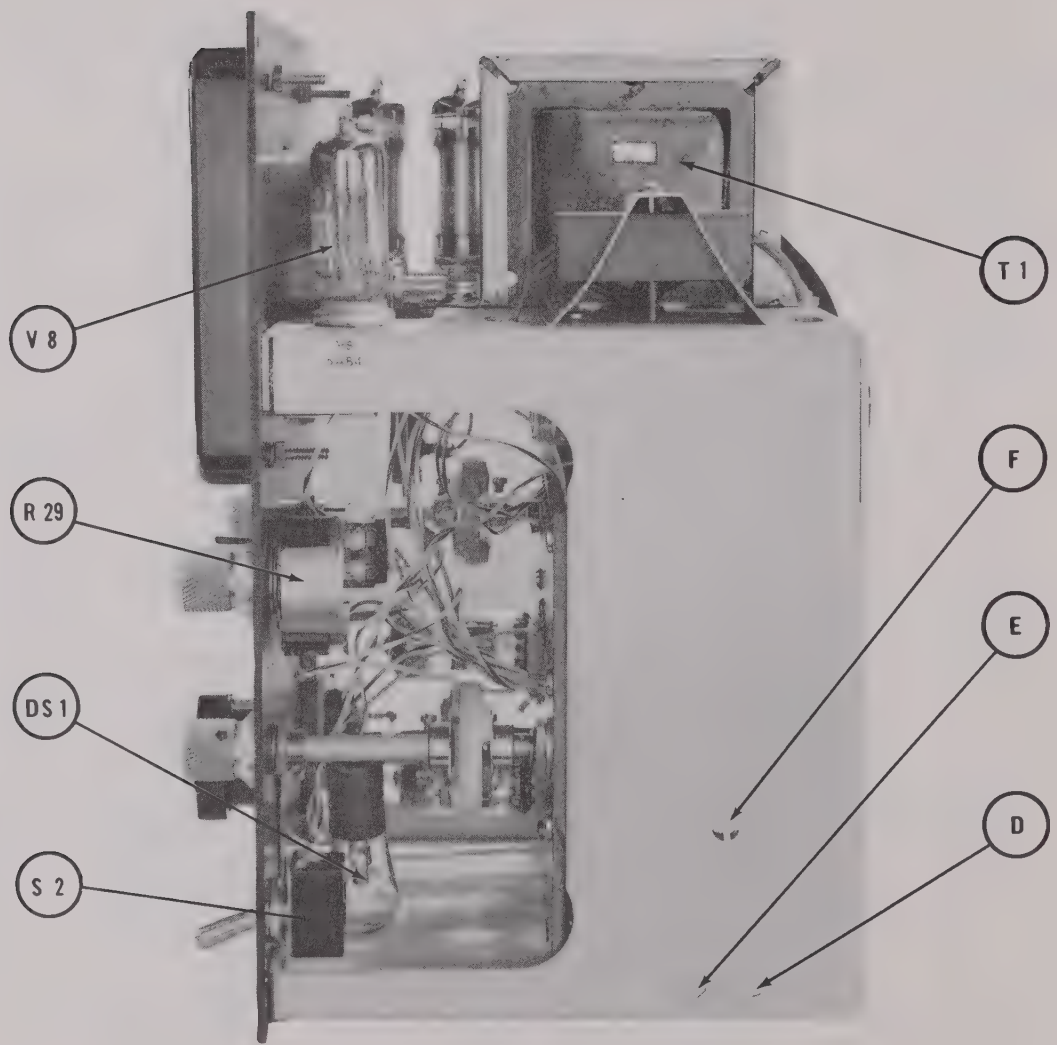


FIGURE 5-2. LEFT SIDE VIEW

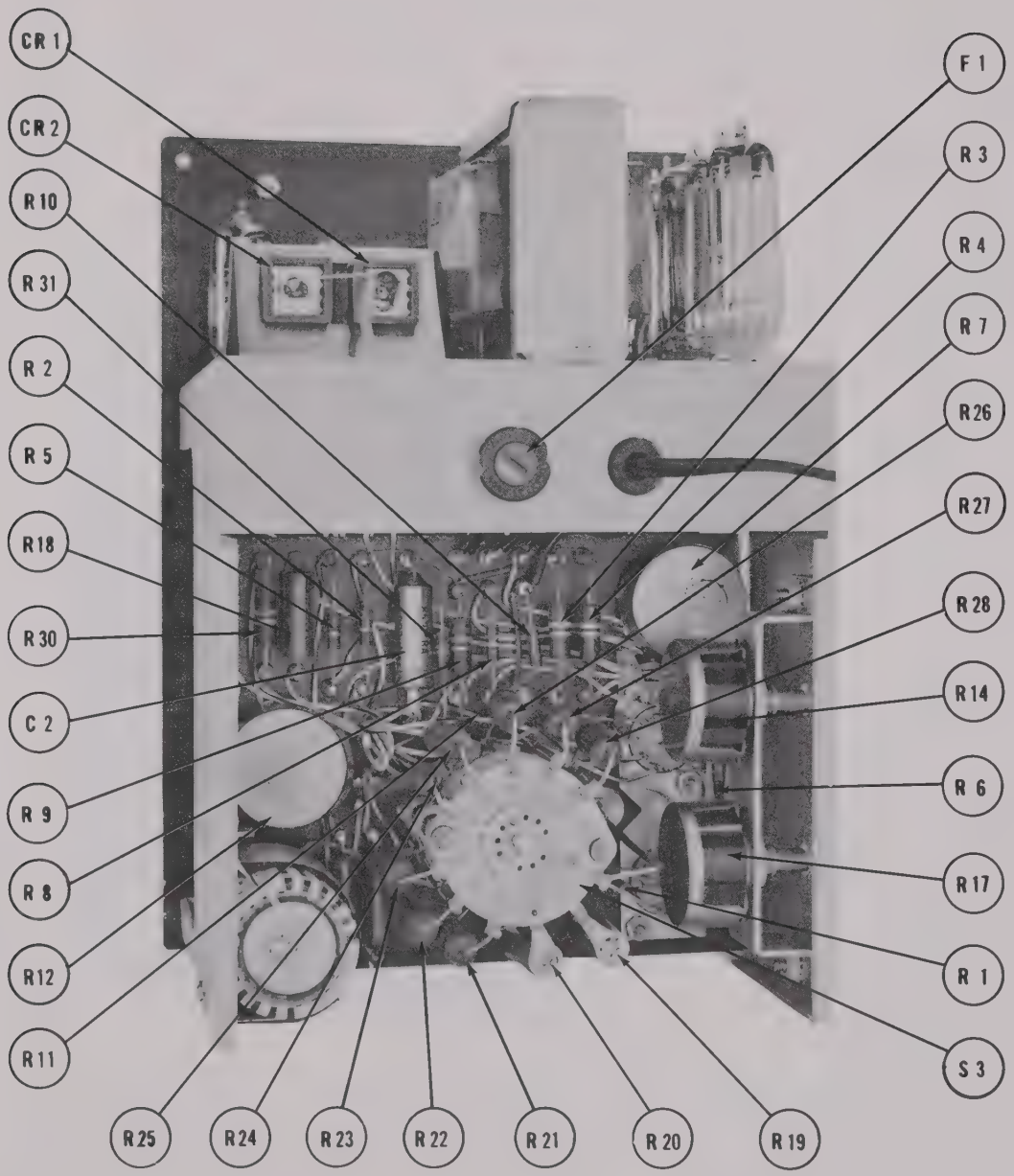


FIGURE 5-3. REAR VIEW

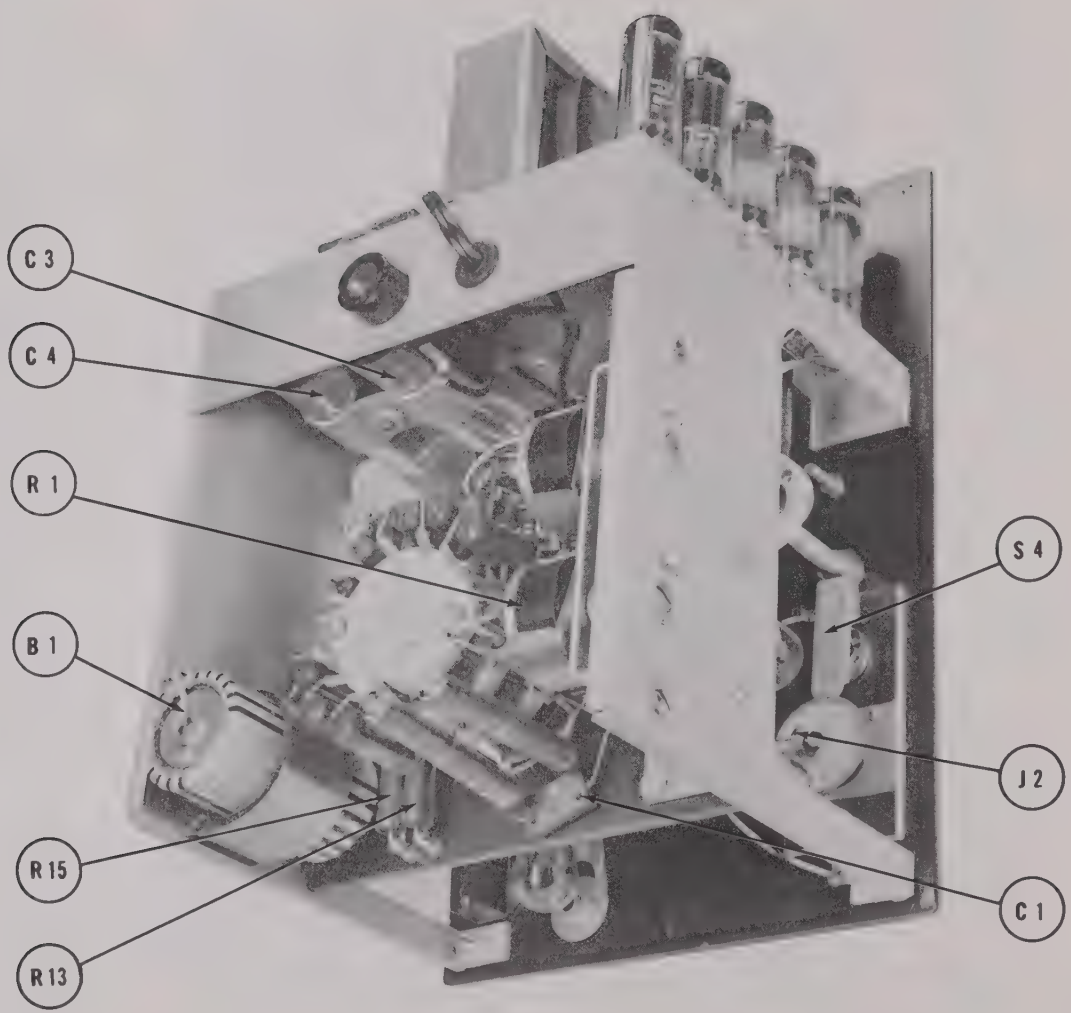
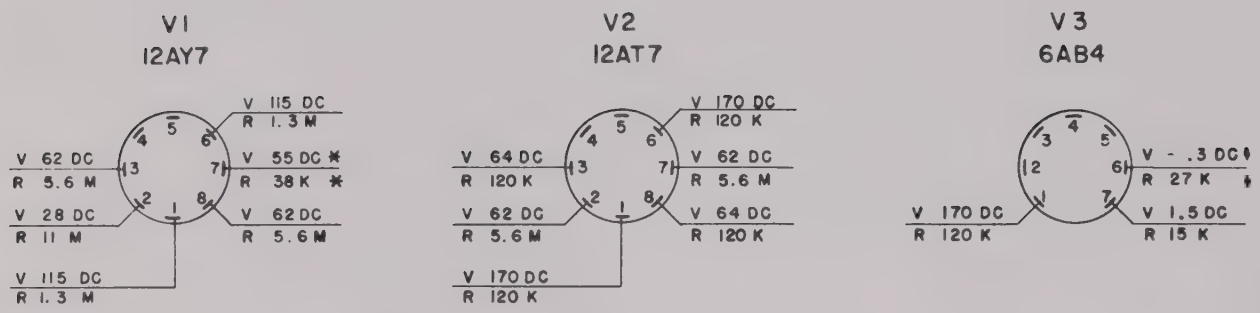


FIGURE 5-4. LOWER REAR VIEW

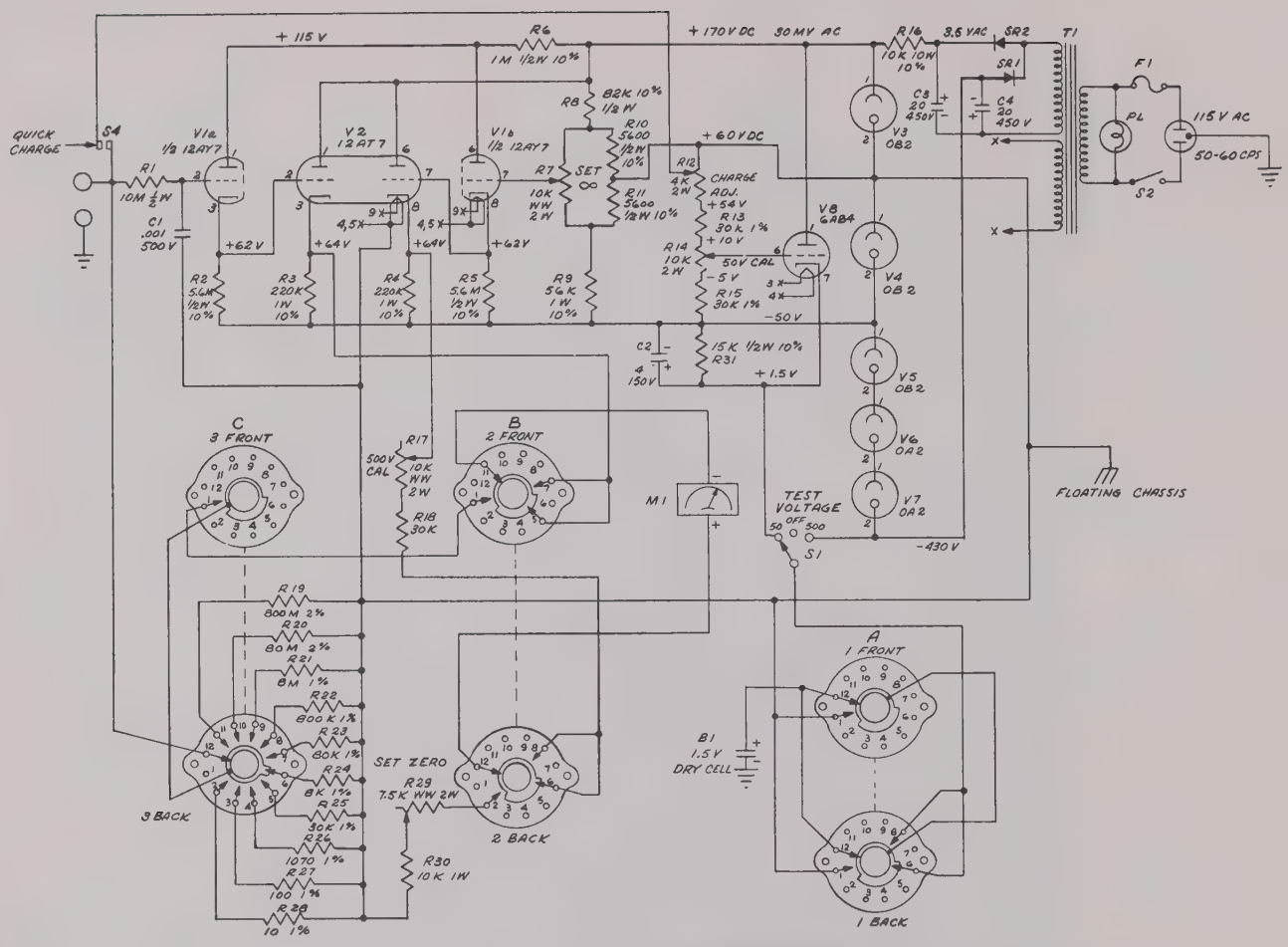


NOTE: FILAMENTS ARE WIRED PARALLEL.

* WILL VARY WITH ADJ. OF R7.
‡ WILL VARY WITH ADJ. OF R14.

VOLTAGES ARE MEASURED TO GROUND.
RESISTANCE IS MEASURED TO PIN 4 OF V4.
SET RANGE SWITCH IN .1 MEGOHM POSITION.
SET TEST VOLTAGE SWITCH IN 50 VOLT POSITION.

FIGURE 5-5. VOLTAGE AND RESISTANCE MEASUREMENT



6. VOLTAGES SHOWN ARE MEASURED TO GROUND WITH TEST VOLTAGE SWITCH IN 50 V. POSITION.
5. ALL CAPACITORS ARE IN MICROFARADS.
4. ALL RESISTORS ARE 1 WATT.
3. ALL RESISTORS ARE IN OHMS.
2. ALL SWITCH WAFERS ARE VIEWED FROM REAR.
1. RANGE SWITCH (S3) SHOWN IN .1 MEGOHM POSITION.

NOTES: (UNLESS OTHERWISE SPECIFIED)

FIGURE 5-6. SCHEMATIC DIAGRAM

SECTION 6

CALIBRATION AND REPAIR

6-1. INTRODUCTION

This section outlines calibration, repairs and replacement procedures. Do not remove parts or wiring until the faulty component has been located. Use standard electronic equipment maintenance technique while repairing this instrument. Remove screws A, B, and C, Figure 3-1, to remove instrument from case.

6-2. CALIBRATION

A. Test equipment required

(1) Voltmeter; 10 megohms (or higher) input resistance, 0-500 volts DC.

(2) Resistance standard; 1 megohm.

B. Preparation

(1) Rotate mechanical meter adjustment screw (Z, Fig. 3-1) to align pointer with infinity mark.

(2) Zero Meter (upper scale).

a. Turn range switch (S3, Fig. 3-1) to 1 ohm position.

b. Shunt input terminals (J1 and J2, Fig. 3-1) with a short length of wire.

c. Rotate SET ZERO control (R29, Fig. 3-1) to align meter pointer with zero.

d. Remove terminal shunting wire.

(3) Set power switch (S2, Fig. 3-1) to ON position and allow instrument to warm-up approximately one minute. "Power on" is shown by lighted indicator (DS1, Fig. 3-1).

NOTE

Set TEST VOLTAGE switch (S1, Fig. 3-1) to 50 v position to make input terminal connections. Voltage indicated by TEST VOLTAGE switch S1 position is internally connected between input terminals J1 and J2.

(4) Input tube grid current check.

a. Open-circuit input terminals.

b. Turn range switch S3 to the .1 megohm position.

c. Align meter pointer with infinity mark by use of SET ∞ control (R7, Fig. 3-1).

d. Turn range switch S3 to the 10^4 megohms position.

e. Check position of meter pointer. Pointer displacement from infinity mark indicates input tube grid current flow. Meter must read above 100 and not more than 2 pointer-widths above infinity mark. Excessive grid current flow can be corrected by input tube replacement (See Section 5).

C. Calibration

(1) 500 V calibrate

a. Connect the 1 megohm resistance standard across input terminals J1 and J2.

b. Turn range switch S3 to the .1 megohm position.

c. Set TEST VOLTAGE switch S2 to the 500 V position.

d. Adjust 500 V CAL control (R17, Fig. 5-2) to align meter pointer with 1 on lower scale.

e. Disconnect resistance standard and rotate SET ∞ control R7 to set meter pointer on infinity mark.

f. Repeat steps 2-4c(a) through (e) until meter pointer is set at both ends of scale.

(2) 50 V calibrate

a. Set TEST VOLTAGE switch S1 in 50 V position.

b. Rotate range switch to the 1.0 MEGOHMS position.

c. Connect the 1 megohm resistance standard across input terminals.

d. Adjust 50 V CAL control R12 to align meter pointer with 1 on lower scale.

e. Disconnect resistance standard and set pointer on infinity mark by use of SET ∞ control R7.

f. Repeat steps (a) through (e) until meter pointer is calibrated at both ends of scale.

CAUTION

Do not short-circuit input terminals while range switch is in a megohm range position.

(3) Megohm range check

a. Terminal voltage check

1. Set the range switch to the 0.1 megohm position and place the TEST VOLTAGE switch in the 50 V position. Connect the R-2 voltmeter across the input terminals and record the R-2 reading. This reading should be 55 v dc ± 3v.

2. Place the TEST VOLTAGE switch in the 500 V position and record the R-2 reading. This reading should be 515 v dc ± 15v. Disconnect the R-2 voltmeter.

b. Use the lower (MEGOHMS) scale in making the following tests. Meter pointer should not drift more than 1/8" on any megohm range.

> **CAUTION**
>
> TEST VOLTAGE switch should be in the OFF position when connecting or disconnecting resistance standards.

1. Set the range switch in the 0.1 megohm position, connect the 100 k resistance standard across the input terminals, set the TEST VOLTAGE switch to the 50 V position and record the meter reading. This reading should be 100 k ohms ± 4K ohms. Turn the TEST VOLTAGE switch to OFF and disconnect the 100 k ohm standard.
2. Connect the 1 megohm standard across the input terminals, set the TEST VOLTAGE switch on 50 V and record the meter reading. This reading should be 1 megohm $\pm \begin{matrix} 500 \text{ k ohms} \\ 250 \text{ k ohms.} \end{matrix}$ Turn the TEST VOLTAGE to OFF and disconnect the 1 megohm standard.
3. Turn the range switch to the 10 megohm position, connect the 10 megohm standard across the input terminals, set the TEST VOLTAGE switch on the 50V position and record the meter reading. This reading should be 10 megohms ± 400 k ohms.

4. Turn the range switch to the 1 megohm position, set the TEST VOLTAGE switch in the 500 V position and record the meter reading. This reading should be 10 megohms ± 400 k ohms. Turn the TEST VOLTAGE switch to OFF and disconnect the 10 megohm standard.
5. Turn the range switch to the 10^2 megohm position, connect the 1900 megohm standard across the input terminals, set the TEST VOLTAGE switch to the 500 V position and record the meter reading. This reading should be 1900 megohms ± 100 megohms. Turn the TEST VOLTAGE switch to OFF and disconnect the 1900 megohm standard.
6. Turn the range switch to the 10^3 megohm position, connect the 10,000 megohm standard across the input terminals, set the TEST VOLTAGE switch to the 500 V position and record the meter reading. This reading should be 19,000 megohms ± 1000 megohms. Turn the TEST VOLTAGE switch to OFF and disconnect the 19,000 megohms standard.
7. Turn the range switch to the 10^4 megohm position, connect the 190,000 megohm standard, set the TEST VOLTAGE switch to the 500 V position and record the meter reading. This reading should be 190,000 megohms ± 10,000 megohms. Turn the TEST VOLTAGE switch to OFF and disconnect the 190,000 megohm standard.

6-3. REMOVAL AND RE-ASSEMBLY OF PARTS AND SUB-ASSEMBLIES

A. Dry Cell, B-1

(1) Portable

a. Unsolder ground wire

b. Loosen screws Ltr. D, E, and F, Fig. 5-2 and remove clamp. Allow dry cell to swing free of case and unsolder positive lead.

c. Reverse order to reinstall.

(2) Rackmounted

a. Unsolder and remove both leads.

b. Loosen clamp top screw and remove dry cell.

c. Reverse order to reinstall.

B. Range selector switch assembly.

(1) Mark and remove wiring.

(2) Loosen set screw on rear side of control shaft flexible coupling.

(3) Unscrew retainer nut from switch shank and remove switch.

(4) Reverse procedures to reinstall.

C. Front panel

(1) Remove all knobs.

(2) Remove pilot lamp lens retainer nut.

(3) Mark and remove wiring from QUICK CHARGE switch and input terminals.

(4) Remove panel nuts from the power and TEST VOLTAGE switches.

(5) Mark and remove meter leads.

(6) Loosen and remove 4 chassis screws and guide panel off switch and control shafts.

(7) Reverse procedures to reinstall.

D. Meter

(1) Mark and remove leads.

(2) Remove 4 mounting nuts and remove meter.

(3) Reverse procedures to reinstall.

E. Selenium rectifiers (CR1 and CR2 Figure 5-3)

(1) Unsolder leads at terminal board.

(2) Hold capacitors (C3 and C4, Figure 5-4) and remove capacitor and rectifier clamp screws. Allow capacitors to hang in place. Remove both rectifiers and clamp.

(3) Reverse procedures to reinstall.

SECTION 7

PARTS LIST

7-1. INTRODUCTION

The tables in this section list all replaceable parts used in the Hathaway Resistance Meters Models C-6B (portable) and C-6RE (rack mounted). To locate parts, refer to the tables in this section and the illustrations in Section 5.

7-2. PARTS TABLE

The parts Table 7-1 is divided into three columns as follows:

A. Reference

This column lists the reference designation, letter and numeral, that identifies each part on the schematic diagram, such as R1, C1, etc.

B. Description

The description of each part in this column includes values, tolerances, and part type (including the manufacturer for reference).

C. Stock Number

This is the Hathaway stock number of the part that is described in column B.

TABLE 7-1. PARTS LIST

REFERENCE	DESCRIPTION TYPE AND MFG	STOCK NO.
	BATTERY	
B1	D size, #2R, BURGESS	59122
	CABLES	
W1	line cord, BELDEN	60232
	CAPACITORS	
C1	0.001 mfg, 500 v dc, CM20, ARCO	53047-13
C2	4 mfd, 150 v dc, BBR, C.D.	44766-10
C3	20 mfd, 450 v dc, MALLORY	59844
C4	20 mfd, 450 v dc, MALLORY	59844
	FUSE	
F1	3 AG, 1.0 amp., LITTLEFUSE	33201-10
	LAMP	
DS1	pilot, 120 volt, type 3S6-5, GE	33700-1
	METER	
M1	0-100 microampere, Model 129, SIMPSON	60040
	RECTIFIERS	
CR1	selenium, STZ #126-35H-Q	60515
CR2	selenium, STZ #126-35H-Q	60515

REFERENCE	DESCRIPTION TYPE AND MFG	STOCK NO.
	RESISTORS	
R1	10 megohm, 10%, 1/2 watt, fixed composition, A.B.	30691-105
R2	5.6 megohm, 10%, 1/2 watt, fixed composition, A.B.	30691-99
R3	220 k ohm, 10%, 1 watt, fixed composition, A.B.	37939-60
R4	220 k ohm, 10%, 1 watt, fixed composition, A.B.	37939-60
R5	5.6 megohm, 10%, 1/2 watt, fixed composition, A.B.	30691-99
R6	1 megohm, 10%, 1/2 watt, fixed composition, A.B.	37938-68
R7	10 k ohm, variable, wirewound, type 252, C.T.S.	59852
R8	82 k ohm, 10%, 1/2 watt, fixed composition, A.B.	37938-55
R9	56 k ohm, 10%, 1 watt, fixed composition, A.B.	37939-53
R10	5.6 k ohm, 10%, 1/2 watt, fixed composition, A.B.	37938-41
R11	5.6 k ohm, 10%, 1/2 watt, fixed composition, A.B.	37938-41
R12	4 k ohm, variable, wirewound, type 252, C.T.S.	59849
R13	30 k ohm, 1%, 1 watt, fixed, deposited carbon.	59921-116
R14	10 k ohm, variable wirewound, type 252, C.T.S.	59852
R15	30 k ohm, 1%, 1 watt, fixed, deposited carbon, DALOHM	59921-116

REFERENCE	DESCRIPTION TYPE AND MFG.	STOCK NO.
R16	10 k ohm, 10 watt, fixed, brown devil, OHMITE	36890-52
R17	10 k ohm, variable, wirewound, type 252, C.T.S.	59852
R18	30 k ohm, 1%, 1 watt, fixed deposited carbon, DALOHM	59921-116
R19	800 megohm, 2%, fixed, type BBF, R.P.C.	59856
R20	80 megohm, 2%, fixed, type BBF, R.P.C.	59855
R21	8 megohm, 1%, 1 watt, fixed, deposited carbon, DALOHM	59921-193
R22	800 k ohm, 1%, 1 watt, fixed, deposited carbon, DALOHM	59921-194
R23	80 k ohm, 1%, 1 watt, fixed, deposited carbon, DALOHM	59921-195
R24	8 k ohm, 1%, 1 watt, fixed, deposited carbon, DALOHM	59921-196
R25	30 k ohm, 1%, 1 watt, fixed, deposited carbon, DALOHM	59921-116
R26	1.07 k ohm, 1%, 1 watt, fixed, deposited carbon, DALOHM	59921-197
R27	100 ohm, 1%, 1 watt, fixed, deposited carbon, DALOHM	59921-57
R28	10 ohm, 1%, 1 watt, fixed, deposited carbon, DALOHM	59921-33
R29	7.5 k ohm, variable, wirebound, type 252, C.T.S.	46202-26
R30	10 k ohm, 10%, 1 watt, fixed, composition, A.B.	30691-33
R31	15 k ohm, 10%, 1/2 watt, fixed, composition, A.B.	37938-46

Table
7-1 (con't)

Model C-6B Resistance Meter
Parts List

REFERENCE	DESCRIPTION TYPE AND MFG.	STOCK NO.
	SWITCHES	
S1	SPDT center off	60898
S2	SPST	59839
S3	Wafer, type 56344-H3C, OAK	60137
S4	Push button, quick charge	60507
	TRANSFORMER	
T1	HATHAWAY	60049
	TUBES	
V1	12 AY 7	59821
V2	12 AT 7	59138
V3	OB 2	59824
V4	OB 2	59824
V5	OB 2	59824
V6	OA 2	59823
V7	OA 2	59823
V8	6 AB 4	59822

TABLE 7-2. RECOMMENDED SPARE PARTS

QUANT.	NAME AND DESCRIPTION	PART NO.
1	Battery, Burgess #2, Size D	59122
1	fuse, 3 AG, 1.5 amp. LITTELFUSE	33201-10
1	lamp, pilot, 120v, GE 3S6-5	33700-1
1	tube, 12 AY 7	59821
1	tube, 12 AT 7	59138
1	tube, OB 2	59824
1	tube, OA 2	59823
1	tube, 6 AB 4	59822

TABLE 7-3. MANUFACTURERS

ABBREVIATION	NAME	ADDRESS
AB	Allen-Bradley Co.	136 W. Greenfield Ave. Milwaukee 4, Wis.
AMPERITE	Amperite Co.	561 Broadway New York 12, N.Y.
ARCO	Arco Electronics Inc.	64 White Street New York, N.Y.
AH&G	Arrow-Hart & Hegeman Elec. Co.	103 Hawthorn Street Hartford 6, Conn.
BELDEN	Belden Mfg.	415 So. Kilpatrich Chicago 44, Illinois
BIRNBACH	Birnbach Radio Co., Inc.	145 Hudson Street New York 13, N.Y.
BURGESS	Burgess Battery Co.	Freeport, Illinois
C.T.S.	Chicago Telephone Supply Corp.	1142 W. Beardsley Ave. Elkhart, Indiana
C.D.	Cornell-Dubilier Electric Corp.	333 Hamilton Blvd. South Plainfield, N.J.
DALOHM	Dale Products, Inc.	1302 28th Avenue Columbus, Nebraska
DIALCO	Dialight Corporation	60 Stewart Avenue Brooklyn 37, N.Y.

Table
7-3 (con't)

Model C-6B Resistance Meter
Manufacturers

ABBREVIATION	NAME	ADDRESS
G.E.	General Electric	W. Genesee Street Auburn, N.Y.
G.R.	General Radio Co.	275 Massachusetts Ave. Cambridge 39, Mass.
HAMMARLUND	Hammarlund Mfg. Co., Inc.	460 W. 34th Street New York 1, N.Y.
HATHAWAY	Hathaway Instruments, Inc.	5800 East Jewell Denver 22, Colo.
KURZ-KASCH	Kurz-Kasch, Inc.	1421 So. Broadway Dayton 1, Ohio
LAVELLE	Lavelle Rubber Co.	424 No. Wood Street Chicago 22, Illinois
LITTELFUSE	Littelfuse, Inc.	1865 Miner Street Des Plaines, Illinois
MAGNAVOX	Magnavox Co.	2131 Bueter Road Fort Wayne 4, Ind.
MALLORY	Mallory, P.R., & Co., Inc.	3029 E. Washington St. Indianapolis 6, Ind.
OAK	Oak Mfg. Co.	1260 No. Clybourn Chicago 10, Illinois
OHMITE	Ohmite Mfg. Co.	3601 Howard St. Skokie, Illinois
R.P.C.	Resistance Products Co.	914 So. 13th Street Harrisburg, Pa.
STZ	Sarkes Tarzian, Inc., Rectifier Div.	415 No. College Ave. Bloomington, Ind.
SHAKEPROOF	Shakeproof, Div. of Ill. Tool Works	St. Charles Road Elgin, Illinois
SIMPSON	Simpson Electric Co., Div. of American Gage & Machine Company	5218 W. Kinzie Street Chicago 44, Illinois

Model C-6B Resistance Meter
Manufacturers

Table
7-3 (con't)

ABBREVIATION	NAME	ADDRESS
SMITH	Smith, Inc., Herman H.	2326 Nostrand Ave. Brooklyn 10, N.Y.
STANLEY	Stanley Tools	New Britian, Conn.
TRUARC	Waldes Kohinoor Inc.	47-16 Austel Place Long Island City 1, N.Y.

SECTION 8

WARRANTY-CLAIMS FOR DAMAGE

SHIPPING INSTRUCTIONS – PROPRIETORSHIP

8-1. WARRANTY

Instruments manufactured by Hathaway Instruments, Inc. are warranted to be free of defects in material and workmanship. This Warranty is effective for six months after instrument has been delivered to original purchaser and is limited to servicing, adjusting, and defective parts replacement, excluding tubes, transistors, and batteries.

If a fault develops, send full details of difficulty to factory. Include model number, type, and serial number. Disposition instructions will be forwarded immediately. Transportation charges must be prepaid.

Instruments returned to factory under the terms of this warranty must disclose to the satisfaction of a factory representative, defective parts or workmanship. An estimate will be submitted prior to making repairs not covered by Warranty.

8-2. CLAIMS FOR DAMAGE IN SHIPMENT

Claims should be filed with the carrier if instrument has been damaged in shipment. Forward full report of damage to factory, including model number, type, and serial number. Do not ship instrument until disposition instructions have been received.

8-3. SHIPPING INSTRUCTIONS

After permission has been obtained from factory, pack instrument in a box large

enough to allow two or three inches of shock absorbent material to surround equipment. Ship prepaid via Parcel Post or Railway Express.

8-4. PROPRIETORSHIP

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WARRANTY

All goods sold under any order are warranted to be free from defects in material and workmanship, and this express warranty is in lieu of and excludes all other warranties, expressed or implied, by operation of law or otherwise.

Defective material must be returned, prepaid, to the Company after inspection by the seller, but only after receipt of definite shipping instructions from the Company. Goods so returned will be repaired or replaced and returned without charge, if in the opinion of the Company there was defective material or workmanship, but the Company shall not be liable for loss, damage, or expense directly or indirectly arising from the use of the material, or from any other cause, its liability being expressly limited to the repair or replacement of defective material.

Every claim on account of defective material or workmanship or from any other cause shall be deemed waived by the purchaser unless made in writing within 1 year from the shipment to which such claim is related. This warranty applies only to the original purchaser.

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